DOCUMENT RESUME

ED 431 941 CE 078 973

TITLE	Enhancing Employee Skills.
PUB DATE	1999-03-00
NOTE	28p.; In: Academy of Human Resource Development (AHRD) Conference Proceedings; see CE 078 963.
PUB TYPE	Reports - Research (143) -- Speeches/Meeting Papers (150)
EDRS PRICE	EDRS Price MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS	Adult Education; Allied Health Occupations Education; Apprenticeships; Auto Mechanics; Case Studies; Computer Literacy; Curriculum; *Education Work Relationship; Employment Qualifications; Focus Groups; Higher Education; *Job Performance; *Job Skills; *Job Training; *Labor Force Development; Military Personnel; Military Training; On the Job Training; Sales Occupations; *Skill Development; Study Habits; Study Skills; Training Methods

ABSTRACT

This document contains four symposium papers on enhancing employee skills. "The Effect of Study Skills Training Intervention on United States Air Force Aeromedical Apprentices" (John C. Griffith) demonstrates how study skills intervention resulted in a significant increase in the end-of-course scores of a sample of 90 randomly selected Air Force members enrolled in a 3-month allied health technical course. "Helping Employees Develop Computer Skills While at Work: An Exploratory Study" (Henriette M. Pranger) reports on a study of how employees develop computer skills at work and presents strategies for enhancing the learning of computer skills in classroom and daily work settings. "Defining Core Problems for On the Job Training: An Example in the Car Repair Trade" (Simone J. van Zolingen, Jan N. Streumer) presents an instrument for systematic description of core problems that was developed after interviews with 30 individuals in 3 occupations (service manager, diagnostic mechanic, and garage receptionist). In "How Can Firms Improve Sales Performance?" (Camille M. Busette), the results of focus group interviews are used to demonstrate that all firms, regardless of their industry or market share position, must overcome very similar problems when conducting training designed to improve sales performance. (MN)

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9 **Enhancing Employee Skills**

Chair: Julie A. Furst-Bowe, University of Wisconsin-Stout

9 - 1 The Effect of Study Skills Training Intervention on United States Air Force Aeromedical Apprentices

John C. Griffith, U.S. Air Force

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Henriette M. Pranger, Quinebaug Valley Community Technical College

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Simone Van Zolingen, University of Twente, The Netherlands

Jan Streumer, University of Twente, The Netherlands

9 - 4 How Can Firms Improve Sales Performance?

Camille M. Busette, AchieveGlobal, Inc.

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The Effect Of Study Skills Training Intervention On United States Air Force Aeromedical Apprentices.

John C. Griffith, Ph.D.
Major, U.S. Air Force

Study skills intervention was shown to significantly increase end of course scores, and decrease remedial instruction for 90 randomly selected students attending a 3 month Air Force allied health technician course. Additionally, students who received the study skills intervention graduated at a higher rate than those who did not. Study skills training, in a corporate setting can enhance student learning and significantly reduce training costs.

Keywords: Study Skills, Cost Savings, Student Performance

Our public education system and national network of colleges and universities are designed to enhance the capabilities of our most valuable national resources, our people. However, many of our educational institutions assume that people know how to learn and know how to study. The teaching of study skills enhance student ability to succeed both academically and in the workforce. An illustration of the value of teaching study skills can be found in the U.S. military. Recruits are brought on active duty, receive formal training and then are assigned a duty position in their career field. Students who fail in technical training are eliminated from active duty before they ever became a "productive member" of the Air Force at a cost of literally millions of dollars per year.

In 1998, a study examined the effects of a study skills training intervention course on U.S. Air Force Aeromedical Apprentices with five main purposes. The first was to examine the relationship between study skills training and the number of times students required academic interventions outside of normal class time. The second purpose was to examine the relationship between study skills training and end of course averages. The third was to determine the relationship between study skills training and the amount of additional instruction, measured in time, students required. The fourth purpose examined the relationship between study skills training and graduation rates. The final purpose was to recommend areas for further research.

Background and History

From 1995 through 1997, Dr Joy Vroonland (Ph.D. University of North Texas) conducted classes that were designed to help military technical school students with their study skills. Vroonland and one assistant gave this training to approximately 3,400 students annually. All of these students were assigned to the 882nd Medical Training Group in 16 allied health professional courses. She believed that the teaching of her study skills course enhanced student performance facilitating student success. However, her opinions were not substantiated by any real statistical analysis. She could not show that the effects of study skills instruction made an impact because the course was taught to all students. No empirical evidence could be shown on the possible positive effects of the study skills training. Moreover, the possible implementation of this study skills course throughout the Air Force depended on the results of an objective and well-designed study.

Statement of the Problem

There was a perceived problem at the School of Aerospace Medicine with regard to student disenrollments, washbacks and failure rates. The school expends a great amount of resources, time and effort to ensure student success. The average cost to train one student in the three month Aeromedical Apprentice course is $12,500.00 (Schommer, 1998). Students who fail the course of study and are eliminated from the program cost thousands of taxpayer dollars with no realized gain by the government or the student.

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Purpose of the Study

The purpose of this study was to determine the difference in academic interventions, grades attained, time spent in one-on-one instruction and graduation rates, between students who received study skills training prior to the start and during technical training and students who do not receive study skills training prior to the start and during technical training.

Hypotheses

Study skills course intervention was hypothesized to reduce the number of academic interventions beyond normal classroom instruction, improve higher end-of-course test scores, reduce the time required for one-on-one instruction for student tutoring beyond normal class room instruction and reduce the attrition (failure) rate.

Limitations

The study did not consider racial or ethnic differences in students as a separate variable since the Air Force does not consider race or ethnicity as a factor when recruiting or delivering instruction to Air Force members. The Air Force only considers race to ensure discrimination does not exist.

Delimitations

1. The sample of students was limited to DOD students attending the School of Aerospace Medicine, Aeromedical Apprentice Course, Brooks Air Force Base Texas, from December 1997 to May 1998.
2. One foreign student was excluded from this study due to differences in culture and educational experience as compared to American students.

Literature Review

An extensive review of literature was conducted and included civilian and military sources to fully investigate research on study skills intervention. Particularly noteworthy was McMurry's work "How to Study and Teaching How To Study", a 1909 effort which formed the foundation of many later works in the field. Walter and Siebert (1993) and Ellis (1997) provided excellent explanations of effective study skills methods. These works formed the foundation of the study skills model used in this experiment. Prather (1983) and Sterling (1996) conducted previous research in military training environments.

The National Commission on Excellence in Education stated that many students complete high school without disciplined and systematic study habits. This idea was highlighted in a 1984 study by Christian and Murphy demonstrating the idea that study skills are not taught in high school. Their survey included 479 students from three widely different high schools. In the survey, 74% indicated a desire to attend college, however 70% had not been trained in time management techniques. Additionally, 52 % of the students indicated that they did not typically listen before they began to take notes, and 52% also indicated that they had no system for note taking during class. A surprising 44 % indicated that they received no training on how to read a text book and 82% of the students reported that they studied less than three times per week. Christian and Murphy concluded that the majority of the students in this survey were not adequately trained in study skills. None of the three schools had an organized curriculum concerning the teaching of study skills even though students seemed to want training in how to study. It cannot be assumed that students entering our universities or service's medical technical schools have the appropriate level of study skills needed to succeed. The issue of students "not knowing how to study" is not new. McMurry (1909) made a passionate argument in his book "How to Study and Teaching How to Study" that most people do not know how to study, causing many to fail. The focus of this research was based on the premise that students who are very much alike can have differences in performance which are directly related to their command of study skills. The grade a student gets at the end of a module or a term is not only based on their intelligence but also their ability to use a given set of study skills for differing subjects or courses (McMurry, 1909; Marshak, 1984). Study skills can be better understood by viewing a "Study Skills Model" shown in Figure 1;

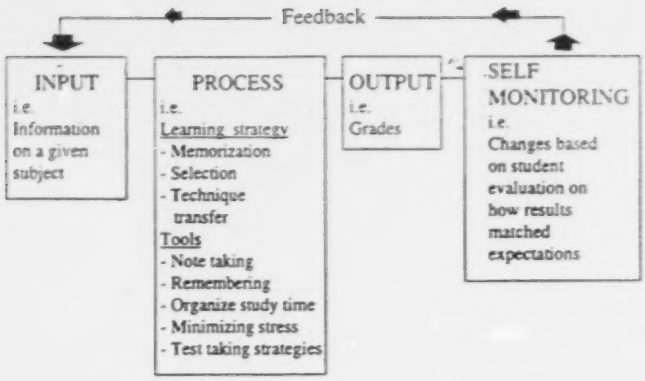

Figure 1. Study skills model.

The model shows four basic steps with a feedback loop used to evaluate the process of study skills and improve it if necessary. The first step is the input process of study skills and focuses on the receiving of information being learned. The second major step in study skills is the process of how the student assimilates data for later use. In this step, the student first determines whether the information has been learned in the past, or is new information. Then the student determines if the information should be memorized, if pertinent information needs to be gleaned from a large amount of information (Selection), or if the student should focus on a specific technique, (such as algebraic formulas) to be used to solve certain types of problems (Technique Transfer). After the student decides the learning strategy, he or she needs to apply the basic study skill techniques which involve effective note taking, remembering, organizing study time, minimizing stress and test taking strategies. The third step in this model is the output the student receives (usually in the form of grades). It is at this point that the student employs "self monitoring" (step four of the model) in answering the question, "did the results match expectations." The student then makes any necessary changes based on the results (grade) for future study.

Differences from Previous Studies

This study on the effects of study skills training intervention on United States Air Force Aeromedical Medicine Apprentices represents a departure from previous studies involving the teaching of study skills to students because it involved military students in a military technical school setting. Previous studies by Smith and Dowdy (1989), Zimmerman and Pons (1986), Christen and Murphy (1985), and Valeri-Gold et al. (1997) have focused on high school or college student settings. Prather (1983) conducted a study at the U.S. Air Force Academy involving 24 students with low grade averages. These studies all assert, in one form or another, that study skills need to be taught to students to enhance their probability of success. Sterling (1996 unpublished dissertation) focused on test anxiety asserting that test anxiety was a factor that could be modified to enhance military student success. Sterling's study was conducted in a military technical school. The major differences between this study and previous studies are that it involved a military technical school setting, focused specifically on the effects of teaching study skills using random sampling (not targeted groups), and followed student progress for at least three months.

Treatment

The treatment in this experiment was originally developed by a board certified psychologist at Sheppard Air Force Base. The researcher modified the course based on the review of literature for this study, four years of experience as an instructor and two years experience as a course supervisor. The treatment (Study Skills Course) was based on the study skills model discussed earlier and emphasized five major areas:

1. Note Taking
2. Remembering

3. Organizing Study Time
4. Minimizing Stress
5. Test Taking Strategies

The class was taught in a 90-minute session prior to the start of the Aeromedical Apprentice course. Additionally, a one-hour follow up session was given to students one month after they began technical training in the Aeromedical Apprentice course. It was intended to put the students in the correct frame of mind to approach their studies in an effective fashion. The class was interactive as the students were encouraged to participate and express their opinions.

The content of the study skills course offered as the treatment in this study is well founded in the literature and previously identified in the discussion of the Study Skills Model.

Research Design

This experiment used the post test only control group design (Campbell & Stanley, 1963; Yount, 1990). This design used a treatment group and a control group. The treatment group received study skills training and was measured on four dependent variables. The control group was measured on the same four dependent variables, but received no treatment (study skills training).

The experimental control used in this study was random assignment (Hinkle, Wiersma & Jurs, 1994; Kirk, 1995; and Kerlinger,1986) and the use of the disguised experiment technique (Kirk, 1995). Subjects were randomly assigned to two groups, the treatment and control group allowing the researcher to consider the treatment and control group statistically equal. In effect then, the design of this experiment is expressed as follows (Campbell & Stanley, 1963; Yount, 1990)

Treatment Group	R	X	O_1
Control Group	R		O_2

The statistical analysis used in this experiment was regression analysis. The aptitude of all students in this experiment had already been measured by the Armed Services Vocational Aptitude Battery Test General Score which was used as a covariate in the experiment. Use of the covariate reduced the amount of unknown error making this design even more powerful (Yount, 1990). The directional hypotheses were tested using regression analysis at the $p < 0.05$ level.

Statistic

All of the hypotheses were tested using regression analysis comparing results obtained from comparing the full model to the restricted model for each hypothesis. The Full Model used was; Y (The dependent variable) = X_1 (Student ASVAB Score) + X_2 (As indicated by a 0 for the control group or 1 as the treatment group to show group membership) + error. The Restricted Model used was; Y (The dependent variable) = X_1 (Student ASVAB Score) + error. The difference between the Full and Restricted Models was represented in an F ratio which indicated significance or non significance. This procedure was used for each hypothesis tested in this study, (Hinkle, 1994).

Ethical Standards

Informed consent was obtained from the University of North Texas human subjects review board. Written approval was obtained from the Commander, School of Aerospace Medicine, Brooks Air Force Base Texas where the study was conducted. This report was made available to the School of Aerospace Medicine and the United States Air Force to further knowledge regarding the effects of study skills training. The study was designed to be as unobtrusive as possible with its only possible impact being improvement of student performance and improved methods for student retention.

Independent Variables

The main independent variable was a study skills intervention consisting of a 90-minute study skills course and a one hour follow-up session four weeks after the start of technical training.

The second independent variable used in this study was student ASVAB General test scores. These scores were designed to show student aptitude. The main purpose for using ASVAB General test scores in this study was to show that the treatment and control groups were similar and to reduce the amount of unknown error making the design even more powerful (Yount, 1990).

Dependent Variables

Maring, Shea and Warner (1987) argued that evaluating a study skills program on the basis of a single variable, such as grade point average, is inappropriate. Therefore, four dependent variables were chosen for this experiment. These variables were: number of academic interventions for individualized instruction, end-of-course test scores, time spent in one-on-one instruction for student individual assistance, and graduation rates. The dependent variables involving extra time devoted to students who needed help beyond normal course time, (number of academic interventions for individualized instruction and time spent in one-on-one instruction for student individual assistance) were reported to the researcher through weekly updates during the experiment. End-of-course scores and graduation rates were reported upon course completion.

Results

This study examined a random sample of 90 U.S. Air Force Aeromedical Apprentice students, (representing a population of approximately 250 students). The sample included Air Force and Air Reserve Component students who were new to the Air Force as well as senior non-commissioned officers with over 15 years of prior military experience. Subjects were randomly assigned into the control and treatment groups of 45 students each and observed for a three-month period.

A detailed analysis using independent samples t-tests was conducted to ensure the control and treatment groups were not different in any statistically significant way at the $p < 0.05$ level. Additionally, the fact that the groups were randomly selected suggests that the control and treatment groups were similar at the beginning of the experiment.

The study skills course was given to the treatment group on the first day of training, (90 minute orientation) followed by a 60 minute session one month later. The study skills course was not given to the control group.

Four null hypotheses were formulated to determine the effectiveness of the study skills course. Each hypothesis was tested by comparing full versus restricted regression models. The differences between the r^2 values of the full and restricted models were then computed to determine statistical significance at the $p < 0.05$ level. These results are shown on the table below;

Table 1

Statistical Results of Full Vs. Restricted Models, Critical Values and Significance Levels

	F Value (Full Vs. Restricted Models)	Critical Value	Sig*.
Ho_1	5.18	3.951	0.025*
Ho_2	5.454	3.951	0.022*
Ho_3	5.048	3.951	0.027*
Ho_4	1.367	3.951	0.246

Hypotheses 1, 2 and 3 were rejected, signifying a statistically significant correlation at the $p<0.05$ level between study skills training and dependent variables of; amount of times additional instruction was required, (negative correlation), end of course grade average, (positive correlation) and additional time required for one-on-one

instruction for student tutoring beyond normal class room instruction, (negative correlation). Hypothesis 4 was retained at the $p<0.05$ level.

Conclusions

Based on the findings of the study, the following conclusions were reached:

1. A statistically significant negative correlation existed between the independent variable of study skills training and the dependent variable of the number of times students required additional assistance outside of normal classroom instruction. Students who were trained in study skills required additional assistance on fewer occasions than students who were not trained in study skills.
2. A statistically significant positive correlation existed between the independent variable of study skills training and the dependent variable of end-of-course grade average. Students who were trained in study skills had higher end of course grade averages than students who were not trained in study skills.
3. A statistically significant negative correlation existed between the independent variable of study skills training and the dependent variable of the amount of time spent in one-on-one instruction for student individual assistance outside of normal class time. Students who were trained in study skills required less time spent in one-on-one instruction for student individual assistance outside of normal class time than students who were not trained in study skills.
4. Although the student attrition-rate was 50% lower in the treatment group, (3) than the control group, (6), the difference was not statistically significant at the $p<0.05$ level. In this particular study, students who were trained in study skills were more likely to graduate than students who were not trained in study skills.
5. The ASVAB General score was a statistically significant predictor of all of the dependent variables used in this study.
6. The Study Skills Model presented earlier is an effective tool to use when developing and delivering a study skills course.
7. Findings of this study were consistent with earlier works of Zimmerman and Ponds, (1986); Kirschembaum and Perri (1982); Entwisle (1960) and Prather (1983). These works indicated that study skills training can yield statistically significant positive results. This is especially true with study skills interventions that include multi-component instruction which involves such components as note taking, reading, test taking strategies, organization of study time, etc. and if the study skills instruction is reinforced over time.
8. The implementation of the study skills course used in this experiment appears to be a very effective use of time and resources. The amount of time and resources expended in providing additional instruction to poor performing students and/or the cost incurred when a student fails a course dictates the use of preventative methods such as the study skills course used in this experiment. The cost of training each Aeromedical Apprentice student was over $12,500.
9. Air Force health care technical schools should encourage the teaching and use of effective study skills techniques to their students that reduce remedial instruction and increase end of course scores and graduation rates. Continued efforts in the area of study skills training will lead to a reduction in costs for the Air Force and savings for U.S. taxpayers.

Recommendations for Further Study

1. The results of this study suggest a possible relationship between study skills training and graduation rates which should be further explored.
2. The results of this study suggest applicability of study skills intervention to other fields of technical training. The study skills intervention course in this experiment could provide a basis for further studies implementing study skills interventions in military and civilian medical and non medical training settings.
3. Further studies regarding age and education level should be conducted prior to implementing a study skills intervention course in adult non-technical training environments.
4. Further research should be conducted in primary and secondary school settings to determine the feasibility of providing sustained cost effective study skills training to students early in their academic careers to enhance their learning capabilities.
5. Further studies should be conducted to identify the minimum number of study skills training sessions required for effective adaptation of study skills as evidenced by little or no remedial training and high graduation rates.

6. Further research should be conducted to determine the projected cost savings of implementing a study skills intervention course throughout U.S. Air Force medical and non medical technical training schools. This analysis could then be applied to the other three branches of the military if cost savings prove significant.
7. Further research should be conducted to reexamine that ASVAB (Aptitude Test) score threshold used to assign Air Force recruits as Aeromedical Apprentice Technicians.

Air Force Implementation

The U. S. Air Force School of Aerospace Medicine has incorporated the study skills course described in this article into all five enlisted courses taught at the school in September, 1998. Additionally, the author has put forth an official Air Force suggestion regarding the implementation of the study skills course for all Air Force initial technical training courses in an effort to offer this training to over 25,000 students per year.

If more students succeed in technical training courses, the Air Force will save money in recruiting and training costs amounting to millions of dollars per year. The current Air Force technical school failure rate is approximately eight percent. The Air Force can save an estimated 1 to 2 million dollars, (in training costs alone) for each percentage point reduction in the failure rate.

Contribution to Human Resources Development

We currently live in an environment where people will be expected to learn more skills and even change careers at an unprecedented rate. U.S. Air Force technical training mirrors many corporate training programs and in fact, sets an example for training a diverse workforce to perform a complex mission. Study skills training, which costs little in resources and time, can help ensure that technical corporate training programs are successful. We can not assume that the workforce knows how to study, or even learn. Many people have not effectively honed these skills. The cost to corporate America due to ineffectiveness is incomprehensible. We need to ensure the workforce has mastered the skills of learning to allow them to adapt to an ever changing environment so that corporate America can succeed in the brave new world of global competitiveness.

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Helping Employees Develop Computer Skills While at Work: An Exploratory Study

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This paper reports findings from a study of how employees develop computer skills at work. Interview data from a cross section of employees working at an international insurance company described what promoted learning from the employees' perspectives. The interview themes were translated into strategies for enhancing the learning of computer skills in classroom and daily work settings. This study applied the deliberate practice framework (Ericsson & Lehmann, 1996) to the development of computer skills.

Keywords: Computer Skills Development, Learning Strategies

In an era when businesses are increasing their use of information technologies, Human Resource Development (HRD) personnel are faced with the problem of helping employees develop computer skills. Many employees need computer skills to gain employment (Dugger, 1997), and must keep their skills current to maintain their jobs (Cahoon, 1996).

A common approach to solving this problem is to offer classroom training (Watkins, 1995), which may not be the most effective strategy for helping employees develop computer skills (Gattiker, 1992). In work settings, new training needs evolve quickly, creating a time lag between the need to learn new skills and the scheduling of classes. Furthermore, research in the area of adult learning indicates that classroom training results in marginally useful outcomes especially when the design of daily work environments does not promote learning (Broad & Newstrom, 1992).

Structuring the work environment to promote learning and to increase overall productivity via technology is one of the major challenges faced by Human Resource Development personnel (Rhinesmith, 1994). New theoretical models are needed that (a) identify when formal classroom training is helpful and (b) account for the ways in which employees learn informally in daily work settings. Theoretical models could then be used to help guide the design of workplace learning initiatives. This study addressed the problem: How can HRD personnel best help employees develop computer skills?

Theoretical Rationale

This section describes the theoretical rationale that guided the design and conduct of this study. Research reviews in the area of computer education identified prior experience as the only variable that consistently demonstrated a noteworthy relationship with the development of computer skills (e.g., Mauer, 1994). In many studies, experience was defined in terms of quantity (e.g., number of hours or classes) which did little to inform practice other than to suggest that more time on the computer leads to improved performance.

Ericsson and Lehmann (1996) disagreed with the conclusion that that skill development is a function of an individual's amount of overall experience. They argued that skill development occurs as the result of engagement in a specific type of experience referred to as deliberate practice. According to Ericsson, Krampe, and Tesch-Romer (1993), "deliberate practice is a highly structured activity, the explicit goal of which is to improve performance. Specific tasks are invented to overcome weaknesses, and performance is carefully monitored to provide cues for ways to improve it further" (p. 368).

The deliberate practice framework describes four general conditions that may contribute to skill development: (1) the learner's willingness to engage in (2) structured learning experiences, (3) guided practice, and (4) independent practice activities. The experts' learning process began with initial interest that was sustained for a long period of time, with encouragement and support from parents or teachers. The learners' motivations to become experts led them to engage in structured learning experiences. Coaches or trainers designed structured learning experiences to (a) improve specific aspects of performance through repetition and successive refinement, and to (b) teach all the relevant knowledge and skills in a discipline. The coach also guided the learners initial practice activities and provided immediate feedback. The learners also completed practice activities independently, which required a high level of concentration and focus.

When experts engaged in structured learning experiences and guided practice that was supplemented by

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independent practice activities, skills developed that set the stage for continued learning and that led to the development of expertise over time (Figure 1). While the general description of this learning process emerged from the analyses of experts' diaries and other autobiographical material, the process may shed some light on how non-experts could improve their skills.

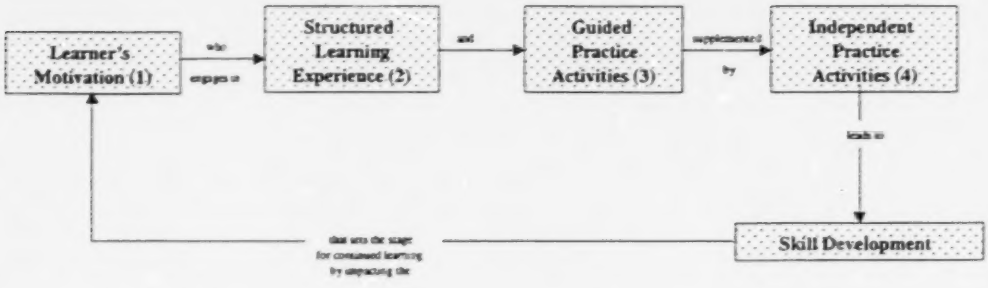

Figure 1. The conditions believed to contribute to the development of expertise: The Deliberate Practice Framework (based on Ericsson & Lehmann, 1996).

Research on the deliberate practice framework was extended to the development of computer skills, but only to the domain of computer programming with highly experienced computing professionals as subjects (see Koubek & Salvendy, 1991; Pirolli & Recker, 1994). This stream of research investigated the cognitive processes associated with expertise (i.e., how experts retrieve, organize, and evaluate information) rather than the usefulness of the deliberate practice framework to promote skill development by discretionary users.

In summary, Ericsson and Lehmann's (1996) work on deliberate practice highlighted the importance of experience to the skill development process and described the general conditions believed to contribute to performance improvement. Although the intent of the research on the development of expertise was to draw conclusions about general human behavior, Ericsson and Hastie (1994) concluded that researchers are "remarkably ignorant" about how people acquire skills in everyday situations (p. 65).

This study extended the focus of prior research by studying adults developing their skills in daily work environments. If computer skills are built day-by-day over time, then the major variables that influence the skill development process may be found in the learners' daily work environment. If experience is an essential component of the process through which experts develop skills, then the deliberate practice framework might be useful for identifying some of the variables, or aspects of an experience, that facilitate the development of computer skills in non-experts. Other variables may also underline the effectiveness of work-related learning experiences.

Methodology

Two questions focused the collection and analysis of data in this study: (1) What aspects of an experience do employees report as promoting or inhibiting the development of computer skills while learning in a *formal, classroom setting*? (2) What aspects of an experience do employees report as promoting or inhibiting the development of computer skills while learning *informally on the job*?

Responses to these questions were collected using an hour-long interview conducted by the researcher. The interview used a semi-structured format that allowed the comparison of answers among employees, but did not restrict the responses to a predetermined set of variables (Bernard, 1994). The data collection began with the employees describing the computer skills required to complete daily job tasks. These skills were limited to (a) skills required to operate a personal computer and (b) skills required to use application software (e.g., Microsoft Office programs). Then the employees sorted cards that listed computer skills into two piles: (1) skills the employee had learned or (2) skills the employee had not yet learned. The employees sorted the cards a second time into (1) skills

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for which classroom learning was most influential and (2) skills for which formal learning was most influential. The interview continued with the employee describing how specific skills were learned. The tape-recorded interviews continued until new data was not offered ($n = 20$).

The interviews were conducted at an international insurance company that was selected because insurance was the major industry in the region and the work environment was characterized by ongoing technological change and high productivity demands. Employees were selected to represent the maximum variation (Patton, 1990) of ages, gender, work experience, and technological expertise found within the department of sixty employees. The sample in this study consisted of a diverse group of employees with respect to age (26-59 years, $M_{age} = 44$), educational level (11-18 years, $M_{years} = 14$, associates degree), and experience learning to use computers (25% beginners, 50% intermediate, and 25% advanced users). All of the employees used the computer to do part of their jobs. Half of the employees had no formal computer training outside the company. All employees had attended at least one company sponsored computer training. While the background characteristics of the sample were diverse, their perceptions of learning outcomes and the learning process were relatively uniform.

The data analysis began when the researcher transcribed the interviews directly into Ethnograph Version 4.0 (Seidel, Friese, & Leonard, 1995), a software program designed for text-based data. The computer program facilitated the researcher's efforts to reduce the information into a series of variables that could then be examined for relationships (Weber, 1990). The approach to content analysis used in this study consisted of eight-steps (Chi, 1997). (1) The researcher read the interview transcripts and created a codebook. (2) The researcher coded segments of text that identified variables that represented employee perceptions of what promoted or hindered their learning. (3) The data were summarized into a hierarchy of themes-by-setting. (4) The researcher then sorted the major themes using the conditions of the deliberate practice framework (e.g., structured learning experience, guided practice, etc.). (5) The researcher re-coded the data a second time. (6) The hierarchy of themes was revised as necessary. (7) The top two levels of the hierarchy were used to answer the research questions and to generate frequencies.

To strengthen the accuracy and objectivity of the data, a second qualitative researcher not associated with the study reviewed the data collection and analysis strategies. The researcher had each employee review and comment on his or her own transcripts as well as a preliminary report of the study findings. The researcher also engaged in peer debriefing at regular intervals during the data analysis process. A limitation of the study was that the findings were derived from the employees' perspectives and were not confirmed through the collection of additional data sources.

Results

An analysis of the interview data revealed three key findings. First, employees reported having learned a wide range of computer skills in both the classroom and daily work setting. Of the 41 skills covered in the interviews, employees reported having learned all of the skills on the job (100%) and 39 of the skills in a classroom setting (95%). The skills ranged from basic skills required to operate a personal computer to skills required to complete job tasks using Microsoft Office application software (e.g., Access, Excel, PowerPoint, Word). In other words, all but two skills were reported having been learned by an employee in either setting. Because the employees reported having learned the same computer skills in both classroom and daily work settings, the researcher concluded that the learning of computer skills was not limited to a classroom setting. This conclusion was supported in the interview data. For example, one employee remarked, "I liked learning in either setting" Another employee remarked, "The classroom training was enough to get me started and then my skills were strengthened over time because I did it on the job."

Second, employees reported that the place of learning (e.g., classroom or work setting) was not as important as the instructional process (e.g., having access to a computer coach). The analysis of the interview transcripts identified eight themes that described employee perceptions as promoting learning in both the classroom and daily work setting. In other words, the same things promoted learning in either setting. The summary provided by Table 1 begins with a column titled "Instructional Process" that lists the integrated theme or activity that functioned across settings. The frequency indicates the number of employees who mentioned the theme at least once. The second and third columns summarize the subthemes by setting.

Third, the themes identified in Table 1 provided a more detailed description of the deliberate practice framework. The following paragraphs discuss the themes highlighted in Table 1 and their relationship to deliberate practice.

Table 1

Employee (n = 20) Perceptions of What Promoted the Development of Computer Skills Across Settings

Instructional Process Major Theme (%, Frequency)	Classroom Setting Sub-themes	Daily Work Setting Sub-themes
1. Reflective Dialogue (95%, 19) *Le became engaged in the learning process whe initiated a conversation with so knowledgeable about computers.*	(+) Talked with instructor (+) Helped by other learners (+) Had all questions answered (+) Completed hands-on act accompanied by discussion	(+) Learner initiated dialogue (+) Dialogue focused on le questions (+) Used clear language, not jarg
2. Independent Practice (95%, 19) *Learner the new skill frequently and experimented.*	(-) Limited practice in class (-) No opportunity to practice class	(+) "Use it or lose it" (+) Opportunity to experiment (+) Job tasks viewed as p activities
3. Direct Experience (85%, *Learners developed computer skills through hands-on experience as opposed to p listening.*	(+) Each person had a computer (+) Hands-on applications	(+) Learn-by-doing (+) Lots of hands-on repetition
4. Guided Practice (85%, *During interactive sessions, the demonstrated a function, and then observ learner practice the new function until comfortable.*	(-) Limited opportunity to apply skill after class with help (-) No access to someone who answer ongoing questions	(+) Someone watched me (+) I watched then s/he watched me (+) Someone observed & pr feedback
5. Helpful Feedback (80%, *Ideal feedback was immediate and was mor showing someone the steps of a function.*	(+) Determined what went wrong	(+) Immediate (+) Identified why I did not understand (+) Answered my repetitive questions (+) Explained why and how
6. Trusting Relationship (75%, *Learning occurred in the context of a t relationship.*	(-) Mixed group composition (-) Large group size (-) Unhelpful trainers	(-) Not helpful coworkers who impatient and answers incomplete (+) Helpful coworkers were pat willing to answer questions
7. Time to Focus on Learning (75%, 15)	(+) Time to learn (+) Focused on learning (+) Few distractions	(-) No time to learn (-) Distractions (-) Conflicting priorities
8. Incremental Learning (60%, *Learners developed computer skills in the cor a genuine problem (e.g., job task) and incremental manner that built on prior knowl*	(+) Made analogy to what is known (+) Related new skill to job tasks (+) Learned step-by-step (+) Built on steps over time	(+) Related to job task (+) Related to what is known (+) Built skills over time

Note. (+) Indicates theme perceived to facilitate learning, (-) indicates theme perceived to inhibit learning.

Structured Learning Experiences

The results from this study confirmed the importance of structured learning activities to the skill development process. The employee descriptions not only confirmed the usefulness of structured learning experiences but also described three helpful aspects of these experiences: (a) reflective dialogue, (b) direct experience, and (c) incremental instruction.

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Employees (95%, 19) perceived structured learning experiences as helpful when they included reflective dialogue. Learning dialogues differed from regular conversation because they were (a) initiated by the learner, (b) centered on the learner's questions, (c) continued until all the learner's questions were answered, (d) used clear language as opposed to computer jargon, and (e) were accompanied by direct experience. Employees (85%, 17) described direct experience as the immediate, hands-on use of the computer as opposed to learning by passively listening and watching someone else demonstrate how to use a skill to perform a task.

Employees (60%, 12) preferred to learn new skills incrementally. Incremental instruction referred to the employees' preferences for learning a new skill (a) step-by-step, (b) in relation to skills already learned, and (c) in small increments over time. A representative statement was, "I like to learn one part first. And, if there are a lot of different ways to do something, I want to get the first way down pat. Then go on to the next one. That is how I like to learn. I don't want to be taught a million things at once. If I am already familiar with it, then I could learn more. I like to learn one thing at a time."

The interview data did not describe traditional, didactic, lecture-based approach to instruction in a large classroom setting. Instead, the employees described smaller, less formal learning sessions characterized by hands-on activity and conversation. These findings suggest that the formal learning experiences (e.g., classroom training or one-on-one coaching) are helpful especially when (a) smaller in size, (b) scheduled as multiple sessions that build on each other, and (c) focus on content learned in a conversational and experiential manner.

Guided Practice

According to the deliberate practice framework, two types of practice activities enhance skill development: (a) with a coach and (b) alone. The employees in the current study also identified these two types of practice activities as promoting the development of computer skills. The study extended the deliberate practice framework by (a) addressing the development of computer skills in organizations and by (b) identifying the characteristics of effective computer coaches.

Employees (85%, 17) identified the guidance provided by another person knowledgeable about computers as essential to the development of computer skills in both the classroom and daily work setting. For example, employees identified trainers or other class participants as coaches in the classroom setting and identified coworkers as coaches on the job. A representative statement was, "I sat at the computer and watched and then she moved over and I took over. She sat with me and watched me for a while to make sure I understood." Employees identified coworkers as informal coaches more often than designated trainers or supervisors. Coaching took place (a) during, (b) in lieu of, or (c) as a follow-up to structured learning experiences.

The study also provided information on the characteristics of effective computer coaches. Coaches promoted or inhibited learning through their feedback. Employees described effective feedback (86%, 16) as immediate and as more than explaining how to perform a skill (e.g., "Do this, then this, then this..."). The ideal nature of feedback was that which: (a) identified why the learner didn't understand something, (b) explained "why a skill worked" in addition to "how to do it", and (c) provided answers to all questions, especially repetitive ones.

The definition of useful feedback had implications for informal coaches who answered technology-related questions. According to one manager, time pressures led employees to answer questions quickly (e.g., how to "get it done") and there were performance consequences when employees are only taught the specific buttons to press rather than the concept or software structure. One consequence was that employees were ill equipped to handle novel situations. The manager discussed the limitations of merely showing someone how to do something without explaining why, "...they don't have to see connections or opportunities to resolve a problem...for example, people who have automatic cars tend to only use them in drive or park. But when the condition changes (for example, rain, severe grades, and snow), they never use any of the additional tools available to them. No one has ever explained to them what the gears are for (for example, a lower gear gives you more traction in wet conditions). If you took training one-step further, they would have more command of the automobile in all situations."

Employees (75%, 15) also preferred to learn new skills from someone perceived as patient, helpful, and respectful. The person was either a trainer or coworker. People were not viewed as helpful when they acted irritated, frustrated, rushed or used computer jargon. This finding has implications for trainers as well as employees who wish to be effective computer coaches. In this study, the resident computer expert was selected as the designated "computer coach." Also of interest was the tendency for the management in this organization to request the resident computer coach to complete special projects that left her little time to help coworkers.

Independent Practice

Ericsson wrote that there is an inherent conflict between working and learning. The potential conflict becomes apparent in the employee descriptions of independent practice. Employees (95%, n = 19) also perceived frequent opportunities to practice using a new skill independently as helping to facilitate learning; however, all but one employee mentioned that more time to was needed to practice and experiment with new skills. Lack of time for independent practice resulted in employees using less efficient skills to complete work tasks or staying with "the old way of doing things." A representative statement from an employee who attended a word-processing class was, "Just recently I was going to use the word-processor to type a fax coversheet rather than hand-write one. I tried to figure out how to do it and I finally gave up. I ran out of time and I decided to just do it by hand. I didn't have time to ask anyone." Independent practice was supported when (a) employees requested and received help, (b) job tasks were designed to reinforce formal training, and (c) and when employees see the direct application of a new skill to the performance of a work task.

The Learner

The initial description of the deliberate practice framework included the learner's motivation level as influencing the learning process. Although motivation was not the focus of this study, interview segments included reasons that the employees gave for learning to use computers. The five reasons mentioned most often were that the employees: (1) needed to learn to solve a problem, (2) wanted to learn because of an immediate benefit (e.g., save time), (3) were forced to learn to maintain employment, (4) enjoyed learning for learning's sake, and (5) were motivated to learn by a possible reward. The reason mentioned most, learned to solve a problem, suggests that coaches identify problems the learner wishes to solve and then present new material in the context of these problems, using exercises that mirror daily work activities as to practice the skill.

In summary, the employees' descriptions validated the deliberate practice framework as a model for describing how adults learn computer skills while at work. The framework places formal training as part of a larger group of learning activities. The data allowed for a more detailed description of how adults learn computer skills at work than provided by the initial deliberate practice framework.

The deliberate practice framework (Ericsson & Lehmann, 1996) was useful for organizing the eight themes and their subthemes. The framework identified how the themes work together to describe a possible model of how employees develop computer skills while at work.

Implications for HRD

Human Resource Development personnel could help employees develop computer skills by incorporating employee perceptions of what does or does not work into the design of learning initiatives. The deliberate practice framework, as described in this study, translated into specific questions that could guide the design of a learning initiative. The first column in Table 2 lists the questions associated with each condition of the deliberate practice framework. The second column lists a specific recommendation suggested by the employees in this study to promote the development of computer skills in their company.

The questions listed in the first column of Table 2 raise two issues. First, are structured learning activities, both formally in the classroom and informally at the learner's desk, designed with the learner's input and offered frequently enough to provide incremental learning? Second, who will serve as computer coaches (e.g., trainers, coworkers, and supervisors) and how do we ensure that they are skillful and effective in their efforts to promote skill development? The second column lists specific strategies for promoting deliberate practice. These include revising job descriptions, performance appraisals, and reward systems to reflect the teaching and learning of technology.

Conclusion

This study places traditional, classroom-based training in the broader framework of deliberate practice, and suggests that formal training be offered in concert with other deliberate practice activities embedded in the daily work setting (e.g., guided practice, independent practice). The theoretical significance of this study was that it extended the framework of deliberate practice to developing computer skills in work settings. The practical significance was that it offered suggestions that HRD personnel could use to improve the development of computer skills in both classroom and daily work settings. Future research could investigate: (a) the validity of the model, (b) the impact of

the process outlined in the model on increasing productivity and the efficient use of technology, and (c) the utility of the model in explaining the development of computer skills across different populations.

Table 2

Designing Classroom and Daily Work Settings to Promote the Development of Computer Skills

Question ✓	Possible Application
Learners	
❑ Are employees in the planning process?	Include employees and managers on committees that determine organizational goals regarding technology and that design/plan educational efforts.
❑ Are learners rewarded for developing computer skills?	Continue to support learning beyond an employee's initial orientation to a job by making learning and teaching part of the employee's daily job responsibilities.
❑ Are employees rewarded for teaching coworkers new skills?	Revise performance evaluations to reward employees for developing new skills that result in more efficient use of technology and for teaching other employees to use those skills.
❑ Do employees see new learning as connected to goals that are personally relevant?	Provide a regular forum for employees to communicate discoveries or suggestions about business applications of PC software that improve productivity.
❑ Do employees have time to learn?	Give employees time to practice new skills (e.g., include learning time when determining production quotas).
Structured Learning Experiences	
❑ Are regular training sessions scheduled both formally in classroom settings and informally at the learner's desk?	Define performance competencies with regard to computer skills. Develop goals and a plan for achieving them that incorporates the principles embedded in the deliberate practice framework.
❑ Are training sessions learner-directed, conversational in nature, and primarily hands-on?	Have trainers, employees, and managers collaborate around the design of regularly scheduled training activities and the design of follow-up practice activities.
❑ Are trainers/coaches skilled in incremental instruction?	Retrain external and internal instructors along with employees in experience-based, developmental teaching techniques.
Guided Practice	
❑ Are coaches skilled in providing informative feedback?	Formalize informal learning networks by updating regularly a list of "who knows what" and who are effective coaches.
❑ Are systems in place so employees have access to immediate feedback?	Provide guidelines and suggestions for effective coaching behaviors and techniques.
	Reward groups as well as individuals (e.g., provide compensation systems that reward performance that includes quality, innovation, and teamwork).
Independent Practice	
❑ Are job tasks assigned so that they (a) build on new skills being learned in structured training sessions and (b) provide opportunities to practice and experiment with new skills?	Reward risk taking and view mistakes as opportunities to learn instead of taking disciplinary actions and marking down job reviews.

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Defining Core Problems for on the Job Training: An Example in the Car Repair Trade

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The aim of this paper is to highlight the importance of the inclusion of core problems in training courses and the presentation of an instrument to describe core problems systematically. Based upon 30 interviews, the core problems of three occupations: service manager, diagnostic mechanic and receptionist working in garages are systematically described.

Keywords: Core Problems, Training, Car Repair Trade

Changes in technology, organizational renewal, optimization of the quality of production and orientation to changing consumer demands require higher standards of skills and flexibility in the work force (Penn, Rose, & Rubery, 1994). In order to meet these standards, it is necessary to deliver more training to the work force and define training in terms of investment rather than costs (Mirvis, 1993). Training of employees can be regarded as a major challange for human resources development. Because of all the changes in the labour system, many simple routinised tasks are automated and complex tasks, where only adaptive human intelligence can make the evaluations and the decisions needed, remain (Resnick & Wirt, 1996). Employees nowedays need to be able to function in an uncertain environment, to handle symbols, to communicate with difficult clients, to work in groups, to learn, to take decisions on their own and to communicate with collegues from different fields (Zuboff, 1988; Appelbaum, & Batt, 1994; Thompson, & Warhurst, 1998). Therefore the aim of training should be broadly trained employees that react flexibly and effectively to changes in their work, organization or career (Van Zolingen, 1995; Nijhof, & Streumer, 1998). This implies a revision of the content of training. A new outlook upon training of the future is to learn employees to handle the core problems of their occupation (Onstenk, 1997a, b, c). Core problems are problems and dilemmas that are central to the practice of an occupation (Laur-Ernst, 1984; Onstenk et al 1990). A first step in this process is to develop an instrument to define and describe core problems for occupations. This paper describes this process for service managers, receptionists and mechanics working in a garage.

Core Problems

Core problems are problems and dilemmas that are central to the practice of an occupation. These are problems with which an employee regularly comes into contact, which are characteristic of that occupation and for which the employee is expected to have a solution for tackling them. They involve considerations and choices relating to dilemmas, where the application of knowledge and skills and the use of the appropriate register of actions will determine whether someone is a more or a less professional worker. Core problems involve characteristic, central occupational situations in which 1) complex problems have to be solved and 2) the specificity of the situation, as well as 3) its social context, play an important role.

In recent publications Onstenk (1997a, b, c) relates core problems to the context of the work organisation as a whole. He distinguishes core problems that relate to 1) the production process, 2) the organisation and 3) the socio-communicative context:

Production problems relate to the object of the work activity (the material and the product), to the instruments and technology employed, and the extent to which the organisation of the work allows for regulatory problems. These are problems that may occur at the time of preparing, performing, supporting or checking tasks in the primary process.

Control and regulatory problems relate in particular to working in a company as a hierarchical organisation where there is a division of labour. These are problems that result from the way in which the production process is organised (think of regulatory tasks; division of tasks; fitting into the organisation; dependence on others; coordination and harmonisation).

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Socio-cultural problems stem from working in the occupational and industrial sector. These are problems that occur when working together with colleagues, in a particular occupational or corporate culture and theories and opinions existing within the occupational category or company that relate to that occupation.

Onstenk emphasises that these problems areas overlap and are interrelated.

Onstenk defines the relationship between core problems and occupations as follows: 'one or more sets of specific production problems, forms of organisation, and socio-cultural context and problems are characteristic of a particular occupation. These characteristic sets can be designated the core problems of an occupation (1997a). In principle, core problems can be defined for every occupation. The 'core' of the occupation can be summarised and structured on the basis of core problems; this definition is, however, not exhaustive. According to Onstenk, an analysis of specific sets of tasks that have to be performed is also needed. He defines occupational competence as a set of routines (knowledge and skills) with which tasks can be performed, the ability to solve problems, to anticipate unexpected situations and to decide when which route is most appropriate, or must be optimised and changed .

Onstenk places the emphasis on three aspects of core problems: These relate to complex problems that are of primary importance in the practice of an occupation. They must be tackled in concrete occupational situations and they are viewed from the standpoint of the employee who has to act in that situation. Core problems are characterised by uncertainty and the weighing up of conflicting considerations and interests in complex situations. In these complex situations, one cannot resort to routine actions, and choices have to be constantly made anew.

Core problems embody the context of an occupation. What is attractive in core problems is that many qualifications have to be deployed for solving core problems. Or, as Onstenk (1997a) expressed it so well: 'core problems emphasise a holistic approach to the occupation.' Moreover, core problems provide the opportunity to contextualise an occupation. Onstenk says: 'The term core problem is intended to be an integrated concept, where the context in which the employee works forms an essential part of the occupation.... Core problems define characteristic, central occupational situations. They are in that sense interesting to education and training: the core of an occupation is demarcated, the content of the occupation is arranged and selected, the position of the employee as an individual who must take action is of central importance. Core problems should therefore contribute to determining the content of vocational education and training (1997a).

Using these insights as a basis, we want to study if it is possible and useful to formulate core problems, and the qualifications which an employee must possess in order to solve them, in a specific sector and within a number of selected occupations.

Research question

What are the core problems of service managers, receptionists and diagnostic mechanics in garages. And how can they systematically be described.

Method

On the research path to the core problems of the service manager, the diagnostic mechanic and the receptionist, we have gone through five phases: (1) choice of the sector, (2) literature search, (3) guidelines for conducting interviews, (4) conducting the interviews and (5) a validation process (Blokhuis & Van Zolingen, 1997).

Why was the car repair sector choosen? At the beginning of the 1980s developments in the car repair sector gained momentum. Rapid expansion of micro-electrical systems in car technology; modernisation of workshop technology, in particular, the introduction of computer-controlled measuring and testing equipment, the introduction of new forms of logistical and administrative automation, and changes in the sales market for cars, all had a great effect on the supply of work and the organisation of work in garages, and on the job content and qualifications required (Warmerdam, 1993). These developments continue to occur in rapid succession, and it is difficult to predict what qualifications car mechanics will need to have in future (Spöttl, 1995). An approach focussing on core problems would therefore appear very suitable for this sector.

Three occupations were studied: the diagnostic mechanic, the service manager and the receptionist. Apart from these qualifications, the job of receptionist was studied, because this job displays interesting contrasts with the other two jobs. First a literature search was conducted into trends in the repair sector, their consequences for jobs in garages, for the qualifications required, and for training in the car repair sector. Furthermore, a brief study was carried out in the area of core problems. Secondly for this study were a total of thirty interviews conducted in twenty

garages with service managers, receptionists, and car mechanics, among others. This study was actively supervised by INNOVAM (the central training facility in the car sector). General data were collected about the occupations and about these employees' work experience, education and training. The core problems of employees were mapped out by conducting a systematic inquiry into the principal tasks of the employees and, as a part of this, into the situations and moments when choices had to be made and decisions taken, where it was not possible to resort immediately to routine actions. Subsequently, questions were asked about the explicit combinations of knowledge and skills that were necessary to solve these core problems. Thirdly on the basis of these interviews, a number of trends and developments in the car repair sector were described. The principal tasks of the occupations of service manager, receptionist and diagnostic mechanic were described, several core problems of the employees (the dilemmas that play a significant role when carrying out their occupation), and the qualifications that the employees needed to solve these core problems. In the fourth place on the advice of INNOVAM, the core problems formulated were submitted for validation to a panel of two experts employed in the area of training in the car repair sector. The experts were requested to assess the recognisability and relevance of the core problems and the qualifications needed to handle them and, where necessary, to make suggestions for adjustments.

Results

Firstly, definitions are given of all three occupations, followed by the core problems with which the employees are confronted in their everyday work and, finally, the qualifications which they must have to solve these core problems. The core problems were characterised on the basis of two aspects: the area of tension in which they occur and the content of the problem. By 'area of tension' is meant the choice between opposites, such as, the choice between time and quality, or the choice between the interests of the customer and the interests of the garage. The description of the content of a core problem gives a concise reproduction of the concrete problem.

Service Manager : a General Definition The service manager bears final responsibility for the workshop of the garage. He is the contact between workshop, reception and after-sales (qualifications: broad technical know-how and experience, at least a diagnostic mechanic and, possibly, a technical specialist, good social skills and a good judge of character). The service manager is increasingly becoming a manager. A service manager must find it a challenge every day anew to please everyone, both the paying element (customer, employer) and the working element (car mechanics). In the process he will, ideally, try to strike a happy medium. This is a distinctly all-round occupation. The service manager is the kingpin in the garage. He is, for example, the person to speak to if a problem arises in the workshop or threatens to arise, or if something needs to be improved.

Frame 1 Principal Tasks of the Service Manager (a concise reproduction)

-To supervise the car mechanics in the workshop.
-To provide technical support to the car mechanics in the workshop.
-To allocate work to the car mechanics in the workshop and keep them busy, in close cooperation with the reception, the warehouse and the sales department.
-To motivate the car mechanics in the workshop.
-To create a good working atmosphere in the workshop, by ensuring that the car mechanics help or support each other, where necessary.
-To monitor and keep up the level of productivity of the workshop by having an overall picture of what is going on there: the workshop turnover, workshop hours and workshop costs, and by marketing promotion.
-To monitor the quality of the work turned out by the workshop, to convince the car mechanics of the importance of good quality and keep himself informed of customer satisfaction or dissatisfaction. Sales maxim:'The first car is sold by the salesman, but the second and subsequent ones are sold by the workshop.'
-To maintain the technical standard of the workshop.
-To act as instructor and make sufficient time free for this.
-If necessary, to step in as a diagnostic specialist in tracing and repairing complicated technical faults.
-To maintain good relations with customers. To assess customers correctly, to deal with customers openly and honestly: to reward customers when they are right and give the customer the benefit of the doubt, to show understanding for the customer's position, to give the customer a comprehensive explanation, if required, possibly to suggest or make a financial arrangement with a customer who cannot pay immediately; in short, to do as much as possible to retain the customer. A service manager remarked: 'You have to try to follow what a customer means at

this particular moment. His train of thought about a problem can vary from day to day. You have to help people decide whether to do something or not, by explaining and sometimes by offering an alternative. You do your best to help the customer drive the car as well and as cheaply as possible.'
-To maintain a good relationship with the shop manager.
-To maintain a good relationship with the other departments, such as the warehouse, the reception and sales.
-To supervise the workshop on environmental matters, to ensure that harmful substances are removed correctly.
-To formulate a personnel policy (engaging apprentices, job placement trainees and car mechanics).
-To deal with damage himself and/or pass it on to a specialist workshop.
-Possibly, to help with repairs himself (small garage) when it is very busy (medium-large garage).
-To deal with administrative work, to ensure that work orders are dealt with properly, also to supervise implementation and compliance with ISO standards if these are in operation in the garage (a couple of garages had just introduced them).

Frame 2: Core Problems of the Service Manager (a concise reproduction)

I Area(s) of tension: time
Content: A service manager may be faced with several different problems (technical and communicative) at the same time. He must be able to adopt a flexible attitude in this situation.

II Area(s) of tension: interests of the customer versus interests of the garage, time versus quality; money
Content: A service manager may be faced with a complicated fault. He must be able to deal with a complicated fault to the satisfaction of the customer and his garage.

III Area(s) of tension: quality versus money; short-term interests versus long-term interests
Content: A service manager may be faced with the purchase of new equipment and tools for the workshop. He must be able to strike the right balance between economy and quality when making these purchases.

IV Area(s) of tension: quality versus money; short-term interests versus long-term interests
Content: A service manager may be faced with a (imminent) shortage of know-how in the workshop. He must be able to ensure that know-how in the workshop remains up to the mark.

V Area(s) of tension: interests of the employees versus interests of the garage, own interests versus interests of employees; quality versus money; short-term interests versus long-term interests; organisation of work.
Content: A service manager may be faced with poor quality work and/or low productivity from the workshop. He must be able to supervise the car mechanics effectively, so that they work optimally, taking as the basic aims good quality work and high productivity.

VI Area(s) of tension: interests of the customer versus interests of the garage; own interests versus interests of the customer; short-term interests versus long-term interests; being creative in following the garage rules.
Content: A service manager may be faced with customers with complaints. He must be able to gain and retain the confidence of these customers.

Receptionist: a General Definition The receptionist maintains good contacts with customers and with the workshop and is able to make quick diagnoses. He advises the customer about maintenance and all other matters relating to the car. He makes a quick diagnosis of the faults reported by customers and translates these into work orders. In close consultation with the service manager, he sees to the car mechanics' work planning. As far as the content of his job is concerned, he has become a service adviser. He is also responsible for as high a return as possible from after-sales (service and spare parts). He is the representative of the garage to the outside world and sells services. In

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addition, he must be able to calculate (cost estimation and subsequent costing, estimate hours and sales), and he is a manager of relationships (retaining, attracting and winning back customers).

Frame 3: Principal Tasks of a Receptionist (a concise reproduction)

-To make a quick diagnosis of a fault reported by a customer. To distinguish vague faults from simple ones. To clarify vague faults by asking further questions, possibly with the aid of a short questionnaire (diagnosis form) and/or by calling in the help of the service manager.
-To sell repairs, services, inspections, accessories.
-To make an estimate for a repair.
-To translate the customer's wishes into an assignment for the workshop.
-To see to substitute transport.
-To plan work, plan the workshop hours available per car mechanic and estimate the workshop hours expected to be needed for an assignment by a car mechanic.
-To allocate the work to the car mechanics (possibly in consultation with the service manager).
-To maintain contacts with the customer about extra costs of a service or a repair.
-To deliver cars to customers. To provide an explanation of the repairs, if requested.
-To register customers' complaints. To report faults which have not been repaired to the service manager.
-To invoice work orders. To do the administration of the work orders.
-To maintain contact with the after-sales team and the workshop manager.

Frame 4: Core Problems of the Receptionist (a concise reproduction)

I Area(s) of Tension: time versus quality; quality
Content: A rapid diagnosis must be made, based on the customer's complaint and this must be clearly worded on a work order.

I Area(s) of tension: interests of the customers versus interests of the garage, own interests versus interests of the customer.
Content: The receptionist also has to deal with difficult, angry and demanding customers. He must be able to deal with these customers in such a way that both the customers and the garage are satisfied.

Diagnostic Mechanic a general definition The diagnostic mechanicis able to apply technical know-how when making diagnoses, repairs and maintenance. In addition to broad technical know-how, he also possesses specialist technical know-how. He is well-informed about the latest developments in the use of electronics in cars. He is the person in the garage par excellence who makes the difficult diagnoses. He supports other car mechanics, possibly with his technical know-how, for example, in repairing faults, or as instructor.

Frame 5: Principal Tasks of a Diagnostic Mechanic (concise reproduction)

-To locate a fault and give a car mechanic the assignment of repairing the fault, possibly with the help of a repair plan.
-To give advice on repairs to other car mechanics.
-To pass on knowledge to other car mechanics. To supervise apprentices.
-To keep up and further extend his own knowledge by following courses,
-To ensure that the workshop equipment is up to standard,
-To help achieve an improvement in the quality of the work in the workshop,
-To behave in a customer-friendly manner when a customer comes to the workshop or when a test drive has to be made, in connection with a complicated fault.
-To carry out repairs,
Possibly help to work on:

-Delivery of new cars
-Delivery of used cars,
-Fitting accessories
-Finishing off services (when it is very busy).

Frame 6 Core Problems of the Diagnostic Mechanic (concise reproduction)

Area(s) of tension: quality; time versus quality
Content: A complicated fault occurs (unknown problem or a recurring problem). The diagnostic mechanic must be able to make a systematic search for the fault, to make a diagnosis and then to repair the fault himself, or to have a car mechanic repair it using a repair assignment.

Table 1
Areas of Tension of the Service Manager, Receptionist and the Diagnostic Mechanic

	Service manager	Receptionist	Diagnostic mechanic
time	x		
quality	x	x	x
time versus quality	x	x	x
money		x	
quality versus money	x		
interests of garage versus interests of customer	x	x	
own interests versus interests of garage	x	x	x
short-term interests versus long-term interests	x		
being creative versus following garage rules	x		

The core problems of the various employees within the car sector differ in degree of difficulty and in nature. As an employee in the car repair sector with a secondary school education develops in his career (from car mechanic, first car mechanic, diagnostic mechanic, receptionist to service manager) the core problems with which he is confronted in the first place become more complicated and he must possess a somewhat broader package of qualifications, which he must be able to apply in more complex situations, in order to be able to continue to perform well. In the second place, an employee who continues to grow will be faced with other core problems. A car mechanic must, for example, know exactly how he can best set to work on a major service. For him, solving core problems relates in particular to the fast and efficient performance of routine actions, repairing complicated faults that have been diagnosed by others, and making simple diagnoses. On the other hand, a diagnostic mechanic has to make diagnoses of faults in cars that are sometimes complicated. This calls particularly on his cognitive abilities for solving (technical) core problems. The receptionist has to deal with core problems of a technical nature, that are less complicated than those of the problems of a social nature. He has a great deal of contact with customers who are demanding and very critical and who all wish to be treated attentively. Furthermore, he sees to the planning of the work for the car mechanics in the workshop, in close cooperation with the service manager. Finally, a workshop manager is responsible for all the problems that occur in the workshop or are related to it. He solves these himself or in consultation with other people. The most charateristic core problem of the service manager is to be able to judge which problem to solve first. Being able to set priorities, and good time-management are, in addition to excellent social skills and technical insight, the essential qualifications which a good service manager must have.

Conclusion

From the study into the car repair sector it emerges that the formulation of core problems is possible and gives an insight into the complexity of the world of work. In addition, the core problems provide an insight into the various

combinations of knowledge and skills which an employee in the car repair sector must have in order to be able to work well in his occupation. Core problems shed light on the areas of tension in which an employee must be able to work in his occupation. Consequently, they provide the opportunity to 'contextualise' an occupation. We are of the opinion that these core problems which mirror the everyday world of work, should also be directional for training of employees in the future. In particular, the breadth and complexity of the employee's everyday reality are portrayed through these core problems more clearly than before. Core problems can serve as the basis for future on the job training by 'coaching and mentoring' employees to handle and reflect upon core problems, insofar as one can 'practise' core problems without jeopardising the production processes, and as long as there is good supervision in handling them. If the production process does not permit this, training courses in which 'artificial' core problems (simulation) are handeled and reflected upon can in the future provide opportunities.

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How Can Firms Improve Sales Performance?

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Do firms which inhabit different market share positions in their respective industries confront different sales training needs? It is the main argument of this paper that, regardless of the firm, sales training must overcome very similar problems. In other words, the challenges that generally motivate firms to engage in sales training are similar across firm type. This paper is based upon the results of focus groups conducted by AchieveGlobal in 1998.

Keywords: Sales Training, Business Strategy, Performance

Do firms which inhabit different market share positions in their respective industries confront different sales training needs? According to (Gutteridge, Liebowitz, and Shore, 1993 and Mann, 1990), many corporations generally recognize the importance of linking Human Resources Development (HRD) practice to business strategy. However, the distinct texture of the ways in which firms pursue the linkage between HRD practice and business strategy is largely a function of the market share position a firm inhabits in its industry (Raghuram, 1994). Miles and Snow (1978) have identified three general types of firms, according to market share position: defenders, analyzers, and prospectors. According to this classification scheme, defenders enjoy a relatively stable product market while prospectors, continually search for new products and markets. Analyzers, the authors argue, are firms that operate in two markets, those characterized by stability and those which are continually changing.

Because defenders operate in a relatively stable product market domain, these types of firms focus on increasing the efficiency of their production rather than on changing their structure, inputs, or operations. But because prospectors continually search for new markets and product opportunities, these types of firms tend to focus more on innovation in products and markets rather than on efficiency. Analyzers operate in two distinctly different product markets, one that is characterized by change, the other which is relatively stable. As expected, in the stable markets of operations, these firms tend to adopt the same foci as defenders, while in their more fluctuating markets, they adopt similar emphases to that of prospectors (Miles and Snow, 1978). Because the analyzer firms use a synthesis of these two types of HRD practices, I will not discuss them as a separate type from here on in.

These differences in business strategy imply differences in approaches to HRD practice. Raghuram (1994) argues that defenders pursue the following HRD practices: they emphasize functional expertise, place great stock on the development of internal talent and emphasize training that results in very specialized knowledge and process based quality improvements, particularly in the finance and production functions. According to Raghuram, prospectors tend to hire those who are already well trained, and then focus any training efforts on broad skills and on marketing, sales, and R&D functions.

In general then, the literature which links HRD practice to business strategy has tended the emphasize the fact that businesses which occupy different positions vis a vis their markets, will pursue distinctly different HRD practices. Given the logic that underpins this argument, we would expect that defenders, analyzers, and prospectors would confront very distinct challenges in the sales function. One would expect, for example, that defenders would have to defend market share, and thus, their sales challenges would center around how to retain existing clients. One would further expect that prospectors, on the other hand, would continually troll for clients. Their main sales challenge would be enticing new clients to contract with them. However, this distinction in the challenges faced by firms occupying different market share positions is not substantiated. Rather, it is the main argument of this paper that, regardless of the firm, sales training must overcome very similar problems. In other words, the challenges that generally motivate firms to engage in sales training are similar across firm type.

What we want to know therefore, is, what are the main challenges that firms will face in the next five years in their sales functions and furthermore, what are the appropriate training interventions that will help firms overcome these challenges. This paper reports on the results of focus groups that AchieveGlobal conducted at a major conference among human resource professionals to explore issues surrounding challenges for the sales function and for conducting sales training.

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Methodology

We conducted 2 focus groups with a total of 23 participants at a human resource conference in May 1998. The participants were selected from the conference list of attendees in such a way as to maximize the variety of industries represented. Focus group participants were either human resource professionals or high level managers who were responsible for developing training programs for some portion of their employee population, from a wide spectrum of industries including banking and finance, insurance, defense, retail, non-profit, pharmaceutical, telecommunications, and hospitals within the United States. The participants represented a variety of firm sizes and market share position. Ten of the 23 participants were employed at firms with more than 200 sales people in the organization. One of the participants represented a firm with less than 10 sales people, while another represented a firm that had between 100 and 200 sales people. A further two participants came from firms with between 10 and 49 sales people and a another two came from firms which employed between 50 and 99 sales people. Please note that because the sample size is small, the results should be viewed more as qualitative than quantitative in nature.

Research Questions

The purpose of conducting the focus groups was to determine what sales function issues organizations are currently facing and if they are different than those issues faced in the last few years. Some of the research questions we posed to focus group participants were the following:

- In the next 3-5 years, which of the listed items do you anticipate as the most important issue facing your sales function?
- What steps or actions does your organization plan to take, to address these challenges?
- In what ways are customers' expectations of sales people different than they were 5 to 10 years ago?
- One recent research study reports that 80% of an organization's sales are generated by 20% of the sales force. What are the skills and characteristics of these people, as compared with others sales folks in your organization?
- Of the above-mentioned skills, which are more critical for the future?

Results and Conclusions

The main finding of the focus groups is that, retaining customers and building their loyalty to a particular firm is largely a function of the degree to which the sales person can meet a customer's increased expectations and build a relationship of trust with that customer. In order for sales associates to retain their client base and to enhance that base over time, they will have to find ways to be efficient with the customer's time while providing the best service and building an enduring positive relationship with the customer. This observation was shared by participants across industries and regardless of the size or market share of the firm. Many participants indicated that their primary customer related challenge was to provide added value to the customer in the context of increased competition and a customer base which is increasingly pressed for time. In general, it was agreed that currently, customers do not have a lot of time to spend with sales people. Thus, in order for sales associates to retain their client base and enhance that base over time, they will have to find ways to be efficient with the customer's time while providing the best service and building an enduring positive relationship with the customer.

When asked to comment on the necessary skills to meet this challenge, many respondents identified a disciplined, efficient approach, success at building positive, long term relationships with customers, and personal motivation as the competencies that characterized highly successful sales people in their organizations. Participants also stated that gaining a customer's trust and achieving in-depth product knowledge were critical skills for the sales function in the future.[1] Again, these observations were shared by participants across a wide variety of industries.

It is the contention of this paper that regardless of product market position, firms across the U.S. face the same set of challenges in the sales function. While the customer of 3 years ago might have been satisfied simply with excellent product knowledge, the customer of the future will now expect the sales person to meet his/her expectations of excellent service product knowledge and efficient use of limited time as well. Responses from our

focus group participants suggest that this challenge is consistent across industry type and market share position. Moreover, managers who participated in the focus groups indicated that the primary strategy for retaining and enticing customers was to build a long term trusting relationship with the customer. Hence, the sales function is now primarily one which will generate revenues by creating a loyal, well-served customer base. The development of strategies that lead to a long-term relationship with the customer is the key thrust of the sales function across the industries represented by these respondents.

It is important to note that, currently, firms pursue different types of sales training initiatives, but that all were searching for sales training that would render their sales staff successful at developing enduring positive relationships with customers. Thus, while firms may differ with respect to how they approach training, the competency content outside of the product specific content is, according to our focus group participants, likely to be quite similar.

As economies slow globally and as competition remains keen for customers, most firms must devise ways to maintain profits at current levels. The most desirable method for doing so is to improve revenue. Often, improving revenue entails improving the sales performance of their field forces. The main challenge of sales training will be to provide sales people with the competencies that allow them to develop trusting long-term relationships wit their clients. Thus, a firm's ability to improve sales performance will rest on the degree to which it is successful in imbuing its sales staff with the necessary competencies identified in this study.

Contribution to HRD

This conclusion is important to HRD in that it isolates the simultaneous stresses that sales people face and suggests that training initiatives in the sales function should target the specific challenges noted, as well as the simultaneity of those challenges. The sales person of the future must be efficient, knowledgeable, and must be skilled at creating a positive relationship with the customer that leaves the customer highly satisfied.

Limitations

As mentioned earlier, this paper is based upon a small sample and the conclusions should therefore be considered qualitative rather than quantitative. The participating organizations, however, tended to have a good deal of experience with sales training and were from a wide variety of industries and organizational sizes. In addition, It is important to note that most respondents were managers and that as noted in endnote 1, mangers views of the necessary competencies for success in sales often diverge from that suggested by objective criteria (Vinchur, et al; 1998).

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